BULLETIN

OF THE

AMERICAN ASTRONOMICAL SOCIETY

PUBLISHED BY THE AMERICAN INSTITUTE OF PHYSICS, INC.

Editor
H. M. GURIN

Editorial Assistant
MARY GROOMS

Editorial Assistant at AIP
DAPHNE LAJOIE

VOLUME 6

1974

Editorial Office: American Astronomical Society, Princeton, New Jersey 08540
Publication Office: American Institute of Physics, Inc., New York, New York 10017
Printed at: Lancaster Press, Inc., Lancaster, Pennsylvania

American Institute of Physics

335 East 45 Street, New York, New York 10017

The American Institute of Physics was founded in 1931 as a federation of leading societies in the field of physics. It combines into one operating agency those functions on behalf of physics which can best be done by the societies jointly. Its purpose is the advancement and diffusion of the knowledge of physics and its application to human welfare. To this end the Institute publishes scientific journals devoted wholly or mainly to physics and related sciences, provides secondary information services, and conducts research in information systems; serves the public by making available to the press and other channels of public information reliable communications of physics and its progress; carries on extensive manpower activities; maintains education projects directed toward providing information about physics education to students, physics teachers, and physics departments; encourages and assists in the documentation and study of the history of recent physics; cooperates with local, national, and international organizations devoted to physics; and fosters the relations of the science of physics to other sciences and to the arts and industries.

MEMBER SOCIETIES:

The American Physical Society
W.W. Havens, Jr., *Executive Secretary*, 335 East 45 Street, New York, NY 10017

Optical Society of America
Jarus W. Quinn, *Executive Director*, 2100 Pennsylvania Avenue, N.W., Washington, DC 20037

Acoustical Society of America
Betty H. Goodfriend, *Administrative Secretary*, 335 East 45 Street, New York, NY 10017

Society of Rheology
R.A. Mendelson, *Secretary*, Monsanto Company, 730 Worcester Street, Indian Orchard, MA 01051

American Association of Physics Teachers
A.A. Strassenburg, *Executive Officer*, AAPT Drawer A-W, Stony Brook, NY 11740

American Crystallographic Association
M.H. Mueller, *Secretary*, Argonne National Laboratory, Bldg. 212, Argonne, IL 60439

American Astronomical Society
Laurence W. Fredrick, *Secretary*, Leander McCormick Observatory, U. of Virginia, Charlottesville, VA 22903

American Association of Physicists in Medicine
Kenneth D. Williams, *Secretary*, Washington Hospital Center, 110 Irving Street, N.W., Washington, DC 20010

AFFILIATED SOCIETIES: American Geophysical Union, American Institute of Aeronautics and Astronautics, American Society for Metals, American Vacuum Society, Division of Physical Chemistry of ACS, Electron Microscopy Society of America, The Geological Society of America, Instrument Society of America, Nuclear Science Group of IEEE, The Philosophical Society of Washington, Physics Club of Chicago, Physics Club of Milwaukee, Physics Club of New York, The Physics Club of Philadelphia, Physics Club of Richmond, Society for Applied Spectroscopy.

CORPORATE ASSOCIATES: About 95 leading industrial enterprises and other institutions which contribute to the support of the Institute.

PUBLICATIONS:

Physical Review A • C.L. Snead, Jr., *Editor*, Brookhaven Natl. Lab., Upton, NY 11973

Physical Review B • P.D. Adams, *Editor*, Brookhaven Natl. Lab., Upton, NY 11973

Physical Review C • H.H. Barschall, *Editor*, Physics Dept., University of Wisconsin, Madison, WI 53706

Physical Review D • S. Pasternack, *Editor*, Brookhaven Natl. Lab., Upton, NY 11973

Physical Review Index • C.L. Snead, Jr., P.D. Adams, H.H. Barschall, S. Pasternack, *Editors*

Reviews of Modern Physics • David Pines, *Editor*, Dept. of Physics, University of Illinois, Urbana, IL 61801

Bulletin of the American Physical Society • W.W. Havens, Jr., *Editor*, Am. Phys. Soc.

Journal of the Optical Society of America • David L. MacAdam, *Editor*, 68 Hammond St., Rochester, NY 14615

Program of the Optical Society of America • Opt. Soc. Am.

The Journal of the Acoustical Society of America • R. Bruce Lindsay, *Editor*, Phys. Dept., Brown Univ., Providence, RI 02912

Program of the Acoustical Society of America • Acoust. Soc. Am.

American Journal of Physics • Edwin F. Taylor, *Editor*, MIT, Room 20C-231, Cambridge, MA 02139

The Physics Teacher • Clifford E. Swartz, *Editor*, Dept. of Physics, SUNY, Stony Brook, NY 11790

The Astronomical Journal • L. Woltjer and L.B. Lucy, *Editors*, Dept. of Astronomy, Columbia Univ., New York, NY 10027

Bulletin of the American Astronomical Society • H.M. Gurin, *Editor*, 211 FitzRandolph Rd., Princeton, NJ 08540

The Journal of Chemical Physics • J.W. Stout, *Editor*, Dept. of Chemistry, The University of Chicago, Chicago, IL 60637

Journal of Mathematical Physics • Morton Hamermesh, *Editor*, Physics Dept., University of Minnesota, Minneapolis, MN 55455

The Physics of Fluids • Francois N. Frenkiel, *Editor*, Comp. & Math. Dept., Naval Ship RD Center, Bethesda, MD 20034

Journal of Applied Physics • Lester Guttman, *Editor*, Argonne Natl. Lab., Box 296, Argonne, IL 60439

Applied Physics Letters • Gilbert J. Perlow, *Editor*, Argonne Natl. Lab., Box 296, Argonne, IL 60439

Review of Scientific Instruments • J.B. Horner Kuper, *Editor*, Brookhaven Natl. Lab., Upton, NY 11973

Journal of Physical and Chemical Reference Data • David R. Lide, Jr., *Editor*, Natl. Bur. Std., Washington, DC 20234

Physics Today • Harold L. Davis, *Editor*, AIP

Journal of Vacuum Science and Technology • Paul A. Redhead, *Editor*, Natl. Res. Council, Ottawa 7, ON, Canada

Medical Physics • Gail D. Adams, *Editor*, P.O. Box 391, Oklahoma City, OK 73101

AIP Conference Proceedings • Hugh C. Wolfe, *Series Editor*, AIP

Current Physics Advance Abstracts (CPAA) • Carolyn De Marco, *Journal Supervisor*, AIP

Current Physics Titles (CPT) • AIP

Current Physics Microform (CPM) • AIP

Searchable Physics Information Notices (SPIN) • AIP

Soviet Physics–JETP
JETP Letters
Soviet Physics–Uspekhi
Soviet Physics–Acoustics
Soviet Physics–Doklady
Soviet Physics–Solid State
Soviet Physics–Semiconductors
Soviet Physics–Technical Physics
Soviet Physics–Crystallography
Soviet Astronomy
Soviet Journal of Nuclear Physics
Soviet Journal of Optical Technology
Optics and Spectroscopy
Soviet Journal of Quantum Electronics
Soviet Journal of Particles and Nuclei

GOVERNING BOARD
H. Richard Crane, *Chairman*
H. William Koch, *ex officio*
George B. Benedek
Robert T. Beyer
Joseph A. Burton
Irving E. Dayton
F.R. Eirich
Michael Ference, Jr.
Kenneth W. Ford
Joseph L. Fowler
Laurence W. Fredrick
James B. Gerhart
S.A. Goudsmit
W.W. Havens, Jr.
Gerald Holton
Robert E. Hopkins
G.A. Jeffrey
John C. Johnson
Wilbur V. Johnson
E. Leonard Jossem
Robert P. Kraft
J.A. Krumhansl
John S. Laughlin
A.I. Mahan
Sidney Millman
Jarus W. Quinn
J. Sandweiss
Frederick Seitz
F. Dow Smith
A.A. Strassenburg
Wallace Waterfall

GENERAL ADMINISTRATION
H. William Koch
Director
Wallace Waterfall
Secretary
Gerald F. Gilbert
Treasurer
Lewis Slack
Associate Director, General Activities
Robert H. Marks
Associate Director, Publishing

DIRECTORS OF PROFESSIONAL DIVISIONS
A.W.K. Metzner
Publications
Theodore Metaxas
Brookhaven Publishing Operation
Harold L. Davis
Physics Today
Lewis Slack
Public Information
Dion W.J. Shea
Education
Raymond W. Sears
Manpower
Charles Weiner
Physics History

PUBLISHING SERVICES
Edward P. Greeley
Advertising Manager
Mitchell Koch
Managing Editor
Mimie Yin
Managing Editor, Translations
Leon Benedict
Composition Manager
Robert Will
Sr. Journal Supervisor
Brookhaven Publishing Operation
John Di Caro
Fulfillment Manager

1/74

BLANK PAGE

BULLETIN OF THE AMERICAN ASTRONOMICAL SOCIETY

Contents for Volume VI (1974)

Number 1

Observatory Reports

Aerospace Corporation 1
Allegheny Observatory 6
University of Arizona 8
Battelle Northwest Laboratories 13
Bell Laboratories 14
University of Chicago (Yerkes) 15
David Dunlap Observatory 21
Dyer Observatory 28
Erwin W. Fick Observatory 30
Five College Astronomy Department 32
University of Florida Observatories 36
Flower and Cook Observatory 41
Harvard College Observatory 45
University of Hawaii 48
Haystack Observatory 56
Hopkins Observatory 60
IBM Research Center 61
University of Iowa 63
Joint Institute: NBS and University of Colorado 66
Kansas University Observatory 74
Kitt Peak–Cerro Tololo 75
Lindheimer Research Center 104
Lockheed Laboratory 106
Louisiana State Observatory 107
Lowell Observatory 109
University of Maryland 112
C. E. Kenneth Mees Observatory 118
University of Michigan 121
Michigan State University 124
National Aeronautics and Space Administration 126
National Bureau of Standards 140
National Radio Astronomy Observatory 144
New Mexico State University 153
Ohio State and Ohio Wesleyan 156
Ohio State Radio Observatory 161
Owens Valley Radio Observatory 162
Princeton University Observatory 166
Ritter Astrophysical Research Center 172
Sagamore Hill Radio Observatory 174
Sproul Observatory 176
U. S. Naval Observatory 177
Van Vleck Observatory 182
Villanova University 183
Wallace Observatory 185
Warner and Swasey Observatory 186
Washburn Observatory 190
University of Washington 195
University of Western Ontario 197
Yale University Observatory 199

Abstracts of Papers Presented at the Dynamical Astronomy Division Meeting Held in Tucson, Arizona, 30 November–1 December 1973 205

Index of Authors 209

NOTICES

Planetary Sciences Division Meeting—Change of Location 210
High Altitude Observatory 210

NUMBER 2, PART I

The 142nd Meeting of the American Astronomical Society, Held 26–29 March 1974 at Lincoln, Nebraska
Abstracts of Papers Presented . . . 211
Index of Authors . . . 228
Index of Categories . . . 229

NUMBER 2, PART II

Editorial: Current Trends in Ph.D. Production and Employment Among Astronomers . 233

OBSERVATORY REPORTS
University of California Observatory . . . 235
Stanford Radio Astronomy Institute . . . 258

Late-Paper Abstracts from the 141st Meeting of the American Astronomical Society Held 2–5 December 1973 at Tucson, Arizona . . . 261
Index of Authors . . . 267
Errata . . . 268

Abstracts of Papers Presented at the High-Energy Astrophysics Division Meeting Held 6–8 December 1973 at Tucson, Arizona . . . 269
Index of Authors . . . 282

Abstracts of Papers Presented at the Solar Physics Division Meeting Held 9–11 January 1974 at Honolulu, Hawaii . . . 284
Index of Authors . . . 299

NOTICES
1975 Trumpler Award . . . 301
Dirk Brouwer Lecture Fund . . . 301

NUMBER 3, PART I

The 143rd Meeting of the American Astronomical Society, Held 20–23 August 1974 at Rochester, New York
Abstracts of Papers Presented . . . 303
Index of Authors . . . 353
Index of Categories . . . 356
Notice . . . 362

NUMBER 3, PART II

Invited and Late-Paper Abstracts from the 142nd Meeting of the American Astronomical Society, Held 26–29 March 1974 at Lincoln, Nebraska 363

Author Index 366

Erratum 366

Abstracts of Papers Presented at the 5th Annual Meeting, AAS Division of Planetary Sciences, Held 2–5 April 1974 at Palo Alto, California 367

Author Index 392

Observatory Reports

High Altitude Observatory 395

Los Alamos Scientific Laboratory of the University of California 398

Smithsonian Astrophysical Observatory 406

Erratum: David Dunlap Observatory 411

Report to the Council of the AAS from the Working Group on the Status of Women in Astronomy—1973 412

Annual Reports for the *Astrophysical Journal:* March 1974 423

NUMBER 4, PART I

The 144th Meeting of the American Astronomical Society, Held 10–13 December 1974 at Gainesville, Florida

Abstracts of Papers Presented 425

Index of Authors 471

Index of Categories 474

Notices

The Cerro Tololo Inter-American Observatory: Revised Telescope Scheduling Procedures 482

Tel-Aviv University—The Florence and George Wise Observatory: Guest Investigators at the Wise Observatory 483

NUMBER 4, PART II

Late Paper Abstracts from the 143rd Meeting of the American Astronomical Society, Held 20–23 August 1974 at Rochester, New York 485
Addendum 485
Session 25 485
Session 26 487
Special TGEA Session 489
Index of Authors 490

Task Group on Education in Astronomy (TGEA): Annual Report for 1974 491

Annual Reports of the AAS Divisions 492
Division on Dynamical Astronomy: 1973–1974 492
Division for High Energy Astrophysics: 1973–1974 493
Division for Planetary Sciences: 1973–1974 493
Division on Solar Physics: 1974 494

Bulletin of the American Astronomical Society: Contents for Volume VI (1974) 496
Number 1 496
Number 2, Part I 497
Number 2, Part II 497
Number 3, Part I 497
Number 3, Part II 498
Number 4, Part I 498
Number 4, Part II 499